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|---|--|
| 1. REQUISITION NUMBER FISD1078-04 | PAGE 1 OF 25 |
| 5. SOLICITATION NUMBER F40650-01-R-0012 | 6. SOLICITATION ISSUE DATE 09/05/01 |
| b. TELEPHONE NUMBER (No collect calls) (931) 454-3918 | 8. ORDER DUE DATE/ LOCAL TIME 09/13/01/2:00 P.M. |

| | | | | | | | | | |
|---|--|---------------------------|--|--|--|--|--|--|--|
| 2. CONTRACT NO. | | 3. AWARD/EFFECTIVE DATE | | 4. ORDER NUMBER | | 5. SOLICITATION NUMBER F40650-01-R-0012 | | 6. SOLICITATION ISSUE DATE 09/05/01 | |
| 7. FOR SOLICITATION INFORMATION CALL: | | a. NAME TONY CLAYBORNE | | | b. TELEPHONE NUMBER (No collect calls) (931) 454-3918 | | | 8. OFFER DUE DATE/ LOCAL TIME 09/13/01/2:00 P.M. | |
| 9. ISSUED BY USAF Procurement Branch Contracting Division 100 Kindel Drive, Suite A332 Arnold AFB TN 37389-1332 Buyer/Symbol: Tony Clayborne/pkp Phone: (931) 454-3918 Email address: Tony.Clayborne@arnold.af.mil | | | | 10. THIS ACQUISITION IS <input checked="" type="checkbox"/> UNRESTRICTED <input type="checkbox"/> SET ASIDE: % FOR <input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> SMALL DISAV. BUSINESS <input type="checkbox"/> 8(A) SIC: SIZE STANDARD: | | 11. DELIVERY FOR FOB DESTINATION UNLESS BLOCK IS MARKED <input type="checkbox"/> SEE SCHEDULE <input checked="" type="checkbox"/> 13a. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 700) 13b. RATING C9e 14. METHOD OF SOLICITATION <input type="checkbox"/> RFQ <input type="checkbox"/> IFB <input checked="" type="checkbox"/> RFP | | 12. DISCOUNT TERMS | |
| 15. DELIVER TO See Block 9 | | | | 16. ADMINISTERED BY See Block 9 | | | | | |
| 17a. CONTRACTOR/ OFFEROR CODE FACILITY CODE | | | | 18a. PAYMENT WILL BE MADE BY DFAS-DY/FV 1050 Forrer Blvd. Dayton OH 45240-1472 | | | | | |
| TELEPHONE NO. | | | | 18b. SUBMIT INVOICES TO ADDRESS SHOWN IN BLOCK 18a UNLESS BLOCK BELOW IS CHECKED <input checked="" type="checkbox"/> SEE ADDENDUM See Block 9 | | | | | |
| <input type="checkbox"/> 17b. CHECK IF REMITTANCE IS DIFFERENT AND PUT SUCH ADDRESS IN OFFER | | | | | | | | | |

| 19. ITEM NO. | 20. SCHEDULE OF SUPPLIES/SERVICES | 21. QUANTITY | 22. UNIT | 23. UNIT PRICE | 24. AMOUNT |
|-----------------|---|-----------------|-------------|-------------------|---------------|
| | (Attach Additional Sheets as Necessary) | | | | |

25. ACCOUNTING AND APPROPRIATION DATA

26. TOTAL AWARD AMOUNT (For Govt. Use Only)

| | |
|---|--|
| <input checked="" type="checkbox"/> 27a. SOLICITATION INCORPORATES BY REFERENCE FAR 52.212-1, 52.212-4. FAR 52.212-3 AND 52.212-5 ARE ATTACHED. <input checked="" type="checkbox"/> ARE <input type="checkbox"/> ARE NOT ATTACHED | |
| <input checked="" type="checkbox"/> 27b. CONTRACT/PURCHASE ORDER INCORPORATES BY REFERENCE FAR 52.212-4. FAR IS ATTACHED. ADDENDA <input type="checkbox"/> ARE <input checked="" type="checkbox"/> ARE NOT ATTACHED | |
| 28. CONTRACTOR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN <u>2</u> COPIES <input checked="" type="checkbox"/> TO ISSUING OFFICE. CONTRACTOR AGREES TO FURNISH AND DELIVER ALL ITEMS SET FORTH OR OTHERWISE IDENTIFIED ABOVE AND ON ANY ADDITIONAL SHEETS SUBJECT TO THE TERMS AND CONDITIONS SPECIFIED HEREIN. | 29. AWARD OF CONTRACT: REFERENCE _____ OFFER <input type="checkbox"/> DATED _____ YOUR OFFER ON SOLICITATION (BLOCK 5), INCLUDING ANY ADDITIONS OR CHANGES WHICH ARE SET FORTH HEREIN, IS ACCEPTED AS TO ITEMS: _____ |

| | | | |
|--------------------------------------|------------------|---|------------------|
| 30a. SIGNATURE OF OFFEROR/CONTRACTOR | | 31a. UNITED STATES OF AMERICA <i>(SIGNATURE OF CONTRACTING OFFICER)</i> | |
| 30b. NAME AND TITLE OF SIGNER | 30c. DATE SIGNED | 31b. NAME OF CONTRACTING OFFICER | 31c. DATE SIGNED |
| | | TONY CLAYBORNE | |

| | | | | | | | |
|--|--|---|--|--|--|------------------------------------|--|
| 32a. QUANTITY IN COLUMN 21 HAS BEEN | | 33. SHIP NUMBER | | 34. VOUCHER NUMBER | | 35. AMOUNT VERIFIED CORRECT FOR | |
| <input type="checkbox"/> RECEIVED <input type="checkbox"/> INSPECTED <input type="checkbox"/> ACCEPTED, AND CONFORMS TO THE CONTRACT, EXCEPT AS NOTED | | <input type="checkbox"/> PARTIAL <input type="checkbox"/> FINAL | | | | | |
| 32b. SIGNATURE OF AUTHORIZED GOV'T. REPRESENTATIVE | | 32c. DATE | | 36. PAYMENT <input type="checkbox"/> COMPLETE <input type="checkbox"/> PARTIAL <input type="checkbox"/> FINAL | | 37. CHECK NUMBER | |
| | | | | 38. S/R ACCOUNT NUMBER 39. S/R VOUCHER NUMBER | | 40. PAID BY | |
| | | | | 42a. RECEIVED BY <i>(Print)</i> | | | |
| 41a. I CERTIFY THIS ACCOUNT IS CORRECT AND PROPER FOR PAYMENT | | | | 42b. RECEIVED AT <i>(Location)</i> | | | |
| 41b. SIGNATURE AND TITLE OF CERTIFYING OFFICER | | 41c. DATE | | 42c. DATE REC'D <i>{YY/MM/DD}</i> | | 42d. TOTAL CONTAINERS | |

Continuation of SF 1449, Blocks 18-24

| Item No | Schedule of Supplies | Quantity | Unit | Unit Price | Amount |
|---------|---|----------|------|------------|--------|
| 0001 | WORK PLAN, in accordance with Attachment #4, Pine Invasiveness Investigation and Modeling, Statement of Objectives, paragraph IV (A). | 1 | EA | \$ | \$ |
| 0002 | QUARTERLY REPORTS, in accordance with Attachment #4, Pine Invasiveness Investigation and Modeling, Statement of Objectives, paragraph IV (B). | 9 | EA | \$ | \$ |
| 0003 | INTERIM REPORTS, in accordance with Attachment #4, Pine Invasiveness Investigation and Modeling, Statement of Objectives, paragraph IV (C). | 2 | EA | \$ | \$ |
| 0004 | FINAL REPORT, in accordance with Attachment #4, Pine Invasiveness Investigation and Modeling, Statement of Objectives, paragraph IV (D). | 1 | EA | \$ | \$ |
| 0005 | GIS PREDICTIVE MODEL AND SPATIAL DATA, in accordance with Attachment #4, Pine Invasiveness Investigation and Modeling, Statement of Objectives, paragraph IV (E). | 1 | EA | \$ | \$ |

Continuation of SF 1449, Block 17B

If remittance is different put address here:

OFFEROR'S PROPOSED DELIVERY SCHEDULE

WITHIN DAYS AFTER THE
DATE OF RECEIPT OF A
WRITTEN NOTICE OF AWARD

| <u>ITEM NO.</u> | <u>QUANTITY</u> |
|-----------------|-----------------|
| 0001 | 1 Each |
| 0002 | 9 Each |
| 0003 | 2 Each |
| 0004 | 1 Each |
| 0005 | 1 Each |

CONTRACT TERMS AND CONDITIONS

52.212-5 CONTRACT TERMS AND CONDITIONS REQUIRED TO IMPLEMENT STATUTES OR EXECUTIVE ORDERS--COMMERCIAL ITEMS (MAY 2001)

(a) The Contractor shall comply with the following FAR clauses, which are incorporated in this contract by reference, to implement provisions of law or executive orders applicable to acquisitions of commercial items:

(1) 52.222-3, Convict Labor (E.O. 11755);

(2) 52.233-3, Protest after Award (31 U.S.C 3553).

(b) The Contractor shall comply with the FAR clauses in this paragraph (b) that the contracting officer has indicated as being incorporated in this contract by reference to implement provisions of law or Executive orders applicable to acquisitions of commercial items or components:

[Contracting Officer shall check as appropriate.]

X__ (1) 52.203-6, Restrictions on Subcontractor Sales to the Government, with Alternate I (41 U.S.C. 253g and 10 U.S.C. 2402).

___ (2) 52.219-3, Notice of HUBZone Small Business Set-Aside (Jan 1999).

X__ (3) 52.219-4, Notice of Price Evaluation Preference for HUBZone Small Business Concerns (Jan 1999) (if the offeror elects to waive the preference, it shall so indicate in its offer).

___ (4) (i) 52.219-5, Very Small Business Set-Aside (Pub. L. 103-403, section 304, Small Business Reauthorization and Amendments Act of 1994).

___ (ii) Alternate I to 52.219-5.

___ (iii) Alternate II to 52.219-5.

X__ (5) 52.219-8, Utilization of Small Business Concerns (15 U.S.C. 637 (d)(2) and (3)).

___ (6) 52.219-9, Small Business Subcontracting Plan (15 U.S.C. 637 (d)(4)).

___ (7) 52.219-14, Limitations on Subcontracting (15 U.S.C. 637(a)(14)).

X__ (8) (i) 52.219-23, Notice of Price Evaluation Adjustment for Small Disadvantaged Business Concerns (Pub. L. 103-355, section 7102, and 10 U.S.C. 2323) (if the offeror elects to waive the adjustment, it shall so indicate in its offer).

___ (ii) Alternate I of 52.219-23.

___ (9) 52.219-25, Small Disadvantaged Business Participation Program-Disadvantaged Status and Reporting (Pub. L. 103-355, section 7102, and 10 U.S.C. 2323).

___ (10) 52.219-26, Small Disadvantaged Business Participation Program-Incentive Subcontracting (Pub. L. 103-355, section 7102, and 10 U.S.C. 2323).

X__ (11) 52.222-21, Prohibition of Segregated Facilities (Feb 1999).

X__ (12) 52.222-26, Equal Opportunity (E.O. 11246).

X__ (13) 52.222-35, Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era (38 U.S.C. 4212).

X__ (14) 52.222-36, Affirmative Action for Workers with Disabilities (29 U.S.C. 793).

X__ (15) 52.222-37, Employment Reports on Disabled Veterans and Veterans of the Vietnam Era (38 U.S.C. 4212).

___ (16) 52.222-19, Child Labor-Cooperation with Authorities and Remedies (E.O. 13126).

___ (17)(i) 52.223-9, Estimate of Percentage of Recovered Material Content for EPA-Designated Products (42 U.S.C. 6962(c)(3)(A)(ii)).

___ (ii) Alternate I of 52.223-9 (42 U.S.C. 6962(i)(2)(C)).

___ (18) 52.225-1, Buy American Act-Balance of Payments Program-Supplies (41 U.S.C. 10a-10d).

___ (19)(i) 52.225-3, Buy American Act - North American Free Trade Agreement - Israeli Trade Act - Balance of Payments Program (41 U.S.C. 10a-10d, 19 U.S.C. 3301 note, 19 U.S.C. 2112 note).

___ (ii) Alternate I of 52.225-3.

___ (iii) Alternate II of 52.225-3.

___ (20) 52.225-5, Trade Agreements (19 U.S.C. 2501, *et seq.*, 19 U.S.C. 3301 note).

X___ (21) 52.225-13, Restriction on Certain Foreign Purchases (E.O. 12722, 12724, 13059, 13067, 13121, and 13129).

(22) 52.225-15, Sanctioned European Union Country End Products (E.O. 12849).

___ (23) 52.225-16, Sanctioned European Union Country Services (E.O. 12849).

X___ (24) 52.232-33, Payment by Electronic Funds Transfer-Central Contractor Registration (31 U.S.C. 3332).

___ (25) 52.232-34, Payment by Electronic Funds Transfer-Other Than Central Contractor Registration (31 U.S.C. 3332).

___ (26) 52.232-36, Payment by Third Party (31 U.S.C. 3332).

___ (27) 52.239-1, Privacy or Security Safeguards (5 U.S.C. 552a).

___ (28) (i) 52.247-64, Preference for Privately Owned U.S.-Flag Commercial Vessels (46 U.S.C. 1241).

___ (ii) Alternate I of 52.247-64.

(c) The Contractor shall comply with the FAR clauses in this paragraph (c), applicable to commercial services, which the Contracting Officer has indicated as being incorporated in this contract by reference to implement provisions of law or executive orders applicable to acquisitions of commercial items or components:

[Contracting Officer check as appropriate.]

___ (1) 52.222-41, Service Contract Act of 1965, As Amended (41 U.S.C. 351, *et seq.*).

___ (2) 52.222-42, Statement of Equivalent Rates for Federal Hires (29 U.S.C. 206 and 41 U.S.C. 351, *et seq.*).

___ (3) 52.222-43, Fair Labor Standards Act and Service Contract Act -- Price Adjustment (Multiple Year and Option Contracts) (29 U.S.C. 206 and 41 U.S.C. 351, *et seq.*).

___ (4) 52.222-44, Fair Labor Standards Act and Service Contract Act -- Price Adjustment (29 U.S.C. 206 and 41 U.S.C. 351, *et seq.*).

____ (5) 52.222-47, SCA Minimum Wages and Fringe Benefits Applicable to Successor Contract Pursuant to Predecessor Contractor Collective Bargaining Agreement (CBA) (41 U.S.C. 351, *et seq.*).

(d) *Comptroller General Examination of Record.* The Contractor shall comply with the provisions of this paragraph (d) if this contract was awarded using other than sealed bid, is in excess of the simplified acquisition threshold, and does not contain the clause at 52.215-2, Audit and Records -- Negotiation.

(1) The Comptroller General of the United States, or an authorized representative of the Comptroller General, shall have access to and right to examine any of the Contractor's directly pertinent records involving transactions related to this contract.

(2) The Contractor shall make available at its offices at all reasonable times the records, materials, and other evidence for examination, audit, or reproduction, until 3 years after final payment under this contract or for any shorter period specified in FAR Subpart 4.7, Contractor Records Retention, of the other clauses of this contract. If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for 3 years after any resulting final termination settlement. Records relating to appeals under the disputes clause or to litigation or the settlement of claims arising under or relating to this contract shall be made available until such appeals, litigation, or claims are finally resolved.

(3) As used in this clause, records include books, documents, accounting procedures and practices, and other data, regardless of type and regardless of form. This does not require the Contractor to create or maintain any record that the Contractor does not maintain in the ordinary course of business or pursuant to a provision of law.

(e) Notwithstanding the requirements of the clauses in paragraphs (a), (b), (c) or (d) of this clause, the Contractor is not required to include any FAR clause, other than those listed below (and as may be required by an addenda to this paragraph to establish the reasonableness of prices under Part 15), in a subcontract for commercial items or commercial components --

(1) 52.222-26, Equal Opportunity (E.O. 11246);

(2) 52.222-35, Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era (38 U.S.C. 4212);

(3) 52.222-36, Affirmative Action for Workers with Disabilities (29 U.S.C. 793);

(4) 52.247-64, Preference for Privately-Owned U.S. Flag Commercial Vessels (46 U.S.C. 1241) (flow down not required for subcontracts awarded beginning May 1, 1996); and

(5) 52.222-41, Service Contract Act of 1965, As Amended (41 U.S.C. 351, *et seq.*).

252.212-7001 CONTRACT TERMS AND CONDITIONS REQUIRED TO IMPLEMENT STATUTES OR EXECUTIVE ORDERS APPLICABLE TO DEFENSE ACQUISITIONS OF COMMERCIAL ITEMS (DEC 2000)

(a) The Contractor agrees to comply with any clause that is checked on the following list of DFARS clauses which, if checked, is included in this contract by reference to implement provisions of law or Executive Orders applicable to acquisitions of commercial items or components.

_____ 252.205-7000 Provision of Information to Cooperative Agreement Holders (10 U.S.C. 2416).

_____ 252.206-7000 Domestic Source Restriction (10 U.S.C. 2304).

_____ 252.219-7003 Small, Small Disadvantaged Business and Women-Owned Small Business Subcontracting Plan (DoD Contracts) (15 U.S.C. 637).

_____ 252.225-7001 Buy American Act and Balance of Payment Program (41 U.S.C. 10a-10d, E.O. 10582).

X_____ 252.225-7007 Buy American Act--Trade Agreements—Balance of Payments Program (41 U.S.C. 10a-10d, 19 U.S.C. 2501-2518, and 19 U.S.C. 3301 note).

X_____ 252.225-7012 Preference for Certain Domestic Commodities.

_____ 252.225-7014 Preference for Domestic Speciality Metals (10 U.S.C. 2241 note).

_____ 252.225-7015 Preference for Domestic Hand or Measuring Tools (10 U.S.C. 2241 note).

_____ 252.225-7016 Restriction on Acquisition of Ball and Roller Bearings

_____ Alternate I (Section 8064 of Pub. L. 106-259).

_____ 252.225-7021 Trade Agreements (19 U.S.C. 2501-2518 and 19 U.S.C. 3301 note).

_____ 252.225-7027 Restriction on Contingent Fees for Foreign Military Sales (12 U.S.C. 2779).

_____ 252.225-7028 Exclusionary Policies and Practices of Foreign Governments (22 U.S.C. 2755).

_____ 252.225-7029 Preference for United States or Canadian Air Circuit Breakers (10 U.S.C. 2534(a)(3)).

_____ 252.225-7036 Buy American Act --North American Free Trade Agreement Implementation Act—Balance of Payments Program (_____ Alternate I) (41 U.S.C. 10a-10d and 19 U.S.C. 3301 note).

_____ 252.227-7015 Technical Data--Commercial Items (10 U.S.C. 2320).

_____ 252.227-7037 Validation of Restrictive Markings on Technical Data (10 U.S.C. 2321).

X _____ 252.243-7002 Request for Equitable Adjustments (10 U.S.C. 2410).

X _____ 252.247-7023 Transportation of Supplies by Sea (_____ Alternate I) (_____ Alternate II) (10 U.S.C. 2631).

_____ 252.247-7024 Notification of Transportation of Supplies by Sea (10 U.S.C. 2631).

(b) In addition to the clauses listed in paragraph (e) of the Contract Terms and Conditions Required to Implement Statutes or Executive Orders – Commercial Items clause of this contract (Federal Acquisition Regulation 52.212-5), the Contractor shall include the terms of the following clauses, if applicable, in subcontracts for commercial items or commercial components, awarded at any tier under this contract:

252.225-7014, Preference for domestic Specialty Metals, Alternate I (10 U.S.C. 2241 note).

252.247-7023, Transportation of Supplies by Sea (10 U.S.C. 2631).

252.247-7024, Notification of Transportation of Supplies by Sea (10 U.S.C. 2631).

In accordance with FAR 12.302, the following documents are hereby incorporated within this solicitation and any resultant contract:

Attachment #4, Pine Invasiveness Investigation and Modeling, Statement of Objectives (6 pages).

SOLICITATION PROVISIONS

52.212-2 EVALUATION--COMMERCIAL ITEMS (JAN 1999)

(a) The Government will award a contract resulting from this solicitation to the responsible offeror whose offer conforming to the solicitation will be most advantageous to the Government, price and other factors considered. The following factors shall be used to evaluate offers:

See Attachment 2, Evaluation Factors and Attachment 3, Past Performance Questionnaire

Technical and past performance, when combined, are: See Attachment 2.

(b) A written notice of award or acceptance of an offer, mailed or otherwise furnished to the successful offeror within the time for acceptance specified in the offer, shall result in a binding contract without further action by either party. Before the offer's specified expiration time, the Government may accept an offer (or part of an offer), whether or not there are negotiations after its receipt, unless a written notice of withdrawal is received before award.

52.212-3 OFFEROR REPRESENTATIONS AND CERTIFICATIONS-- COMMERCIAL ITEMS (MAY 2001)

a) *Definitions.* As used in this provision:

"Emerging small business" means a small business concern whose size is no greater than 50 percent of the numerical size standard for the NAICS code designated.

"Forced or indentured child labor" means all work or service-

(1) Exacted from any person under the age of 18 under the menace of any penalty for its nonperformance and for which the worker does not offer himself voluntarily; or

(2) Performed by any person under the age of 18 pursuant to a contract the enforcement of which can be accomplished by process of penalties.

"Service-disabled veteran-owned small business concern"-

(1) Means a small business concern-

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

"Small business concern" means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and size standards in this solicitation.

"Veteran-owned small business concern" means a small business concern-

(1) Not less than 51 percent of which is owned by one or more veterans(as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

"Women-owned small business concern" means a small business concern --

(1) Which is at least 51 percent owned by one or more women or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

"Women-owned business concern" means a concern which is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of the its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

(b) *Taxpayer identification number (TIN) (26 U.S.C. 6109, 31 U.S.C. 7701).* (Not applicable if the offeror is required to provide this information to a central contractor registration database to be eligible for award.)

(1) All offerors must submit the information required in paragraphs (b)(3) through (b)(5) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M, and implementing regulations issued by the Internal Revenue Service (IRS).

(2) The TIN may be used by the government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.]

(3) *Taxpayer Identification Number (TIN).*

☐ TIN: _____.

☐ TIN has been applied for.

☐ TIN is not required because:

☐ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

☐ Offeror is an agency or instrumentality of a foreign government;

☐ Offeror is an agency or instrumentality of the Federal Government;

(4) *Type of organization.*

☐ Sole proprietorship;

☐ Partnership;

☐ Corporate entity (not tax-exempt);

☐ Corporate entity (tax-exempt);

☐ Government entity (Federal, State, or local);

☐ Foreign government;

☐ International organization per 26 CFR 1.6049-4;

☐ Other _____.

(5) *Common parent.*

☐ Offeror is not owned or controlled by a common parent:

[] Name and TIN of common parent:

Name _____

TIN _____

(c) Offerors must complete the following representations when the resulting contract is to be performed inside the United States, its territories or possessions, Puerto Rico, the Trust Territory of the Pacific Islands, or the District of Columbia. Check all that apply.

(1) *Small business concern.* The offeror represents as part of its offer that it [] is, [] is not a small business concern.

(2) *Veteran-owned small business concern.* [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents as part of its offer that it [] is, [] is not a veteran-owned small business concern.

(3) *Service-disabled veteran-owned small business concern.* [Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (c)(2) of this provision.] The offeror represents as part of its offer that it [] is, [] is not a service-disabled veteran-owned small business concern.

(4) *Small disadvantaged business concern.* [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents, for general statistical purposes, that it [] is, [] is not, a small disadvantaged business concern as defined in 13 CFR 124.1002.

(5) *Women-owned small business concern.* [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents that it [] is, [] is not a women-owned small business concern.

Note: Complete paragraphs (c)(6) and (c)(7) only if this solicitation is expected to exceed the simplified acquisition threshold.

(6) *Women-owned business concern (other than small business concern).* [Complete only if the offeror is a women-owned business concern and did not represent itself as a small business concern in paragraph (c)(1) of this provision.]. The offeror represents that it [] is, a women-owned business concern.

(7) *Tie bid priority for labor surplus area concerns.* If this is an invitation for bid, small business offerors may identify the labor surplus areas in which costs to be incurred on account of manufacturing or production (by offeror or first-tier subcontractors) amount to more than 50 percent of the contract price:

(8) Small Business Size for the Small Business Competitiveness Demonstration Program and for the Targeted Industry Categories under the Small Business Competitiveness Demonstration Program. *[Complete only if the offeror has represented itself to be a small business concern under the size standards for this solicitation.]*

(i) (Complete only for solicitations indicated in an addendum as being set-aside for emerging small businesses in one of the four designated industry groups (DIGs).) The offeror represents as part of its offer that it [] is, [] is not an emerging small business.

(ii) (Complete only for solicitations indicated in an addendum as being for one of the targeted industry categories (TICs) or four designated industry groups (DIGs).) Offeror represents as follows:

(A) Offeror's number of employees for the past 12 months (check the Employees column if size standard stated in the solicitation is expressed in terms of number of employees); or

(B) Offeror's average annual gross revenue for the last 3 fiscal years (check the Average Annual Gross Number of Revenues column if size standard stated in the solicitation is expressed in terms of annual receipts).

(Check one of the following):

| <u>Number of Employees</u> | <u>Average Annual Gross Revenues</u> |
|----------------------------|--------------------------------------|
| 50 or fewer | \$1 million or less |
| 51-100 | \$1,000,001-\$2 million |
| 101-250 | \$2,000,001-\$3.5 million |
| 251-500 | \$3,500,001-\$5 million |
| 501-750 | \$5,000,001-\$10 million |
| 751-1,000 | \$10,000,001-\$17 million |
| Over 1,000 | Over \$17 million |

(9) *[Complete only if the solicitation contains the clause at FAR 52.219-23, Notice of Price Evaluation Adjustment for Small Disadvantaged Business Concerns, or FAR 52.219-25, Small Disadvantaged Business Participation Program-Disadvantaged]*

Status and Reporting, and the offeror desires a benefit based on its disadvantaged status.]

(i) *General.* The offeror represents that either-

(A) It [] is, [] is not certified by the Small Business Administration as a small disadvantaged business concern and identified, on the date of this representation, as a certified small disadvantaged business concern in the database maintained by the Small Business Administration (PRO-Net), and that no material change in disadvantaged ownership and control has occurred since its certification, and, where the concern is owned by one or more individuals claiming disadvantaged status, the net worth of each individual upon whom the certification is based does not exceed \$750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); or

(B) It [] has, [] has not submitted a completed application to the Small Business Administration or a Private Certifier to be certified as a small disadvantaged business concern in accordance with 13 CFR 124, Subpart B, and a decision on that application is pending, and that no material change in disadvantaged ownership and control has occurred since its application was submitted.

(ii) *Joint Ventures under the Price Evaluation Adjustment for Small Disadvantaged Business Concerns.* The offeror represents, as part of its offer, that it is a joint venture that complies with the requirements in 13 CFR 124.1002(f) and that the representation in paragraph (c)(7)(i) of this provision is accurate for the small disadvantaged business concern that is participating in the joint venture. [The offeror shall enter the name of the small disadvantaged business concern that is participating in the joint venture:

_____.]

(10) (Complete if the offeror has represented itself as disadvantaged in paragraph (c)(2) or (c)(9) of this provision.) [The offeror shall check the category in which its ownership falls]:

_____ Black American

_____ Hispanic American

_____ Native American (American Indians, Eskimos, Aleuts, or Native Hawaiians).

_____ Asian-Pacific American (persons with origins from Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Japan, China, Taiwan, Laos, Cambodia

(Kampuchea), Vietnam, Korea, The Philippines, U.S. Trust Territory or the Pacific Islands (Republic of Palau), Republic of the Marshall Islands, Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, Guam, Samoa, Macao, Hong Kong, Fiji, Tonga, or Nauru).

_____ Subcontinent Asian (Asian-Indian) American (persons with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands, or Nepal).

_____ Individual/concern, other than one of the preceeding.

(11) HUBZone Small business concern. [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents as part of its offer that-

(i) It [] is, [] is not a HUBZone small business concern listed, on the date of this representation, on the List of Qualified HUBZone Small Business Concerns Maintained by the Small Business Administration, and no material change in ownership and control, principal place of ownership, or HUBZone employee percentage has occurred since it was certified by the Small Business Administration in accordance with 13 CFR part 126; and

(ii) It [] is, [] is not a joint venture that complies with the requirements of 13 CFR part 126, and the representation in paragraph (c)(11)(i) of this provision is accurate for the HUBZone small business concern or concerns that are participating on the joint venture. [The offeror shall enter the name or names of the HUBZone small business concern or concerns that are participating in the joint venture:

_____.]

Each HUBZone small business concern participating in the joint venture shall submit a separate signed copy of the HUBZone representation.

(d) Representations required to implement provisions of Executive Order 11246 --

(1) *Previous contracts and compliance.* The offeror represents that --

(i) It [] has, [] has not, participated in a previous contract or subcontract subject either to the Equal Opportunity clause of this solicitation; and

(ii) It [] has, [] has not, filed all required compliance reports.

(2) *Affirmative Action Compliance.* The offeror represents that --

(i) It ☐ has developed and has on file, ☐ has not developed and does not have on file, at each establishment, affirmative action programs required by rules and regulations of the Secretary of Labor (41 CFR parts 60-1 and 60-2), or

(ii) It ☐ has not previously had contracts subject to the written affirmative action programs requirement of the rules and regulations of the Secretary of Labor.

(e) *Certification Regarding Payments to Influence Federal Transactions (31 U.S.C. 1352).* (Applies only if the contract is expected to exceed \$100,000.) By submission of its offer, the offeror certifies to the best of its knowledge and belief that no Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress or an employee of a Member of Congress on his or her behalf in connection with the award of any resultant contract.

(f) *Buy American Act - Balance of Payments Program Certificate.* (Applies only if the clause at Federal Acquisition Regulation (FAR) 52.225-1, Buy American Act - Balance of Payments Program--Supplies, is included in this solicitation.)

(1) The offeror certifies that each end product, except those listed in paragraph (f)(2) of this provision, is a domestic end product (as defined in the clause of this solicitation entitled "Buy American Act - Balance of Payments Program--Supplies") and that the offeror has considered components of unknown origin to have been mined, produced, or manufactured outside the United States. The offeror shall list as foreign end products those end products manufactured in the United States that do not qualify as domestic end products.

(2) Foreign End Products:

| LINE ITEM NO. | COUNTRY OF ORIGIN |
|---------------|-------------------|
| | |
| | |
| | |

[List as necessary]

(3) The Government will evaluate offers in accordance with the policies and procedures of FAR Part 25.

(g)

(1) *Buy American Act -- North American Free Trade Agreement -- Israeli Trade Act - Balance of Payments Program Certificate.* (Applies only if the clause at FAR

52.225-3, Buy American Act -- North American Free Trade Agreement Israeli Trade Act -- Balance of Payments Program, is included in this solicitation.)

(i) The offeror certifies that each end product, except those listed in paragraph (g)(1)(ii) or (g)(1)(iii) of this provision, is a domestic end product as defined in the clause of this solicitation entitled "Buy American Act -- North American Free Trade Agreement Israeli Trade Act -- Balance of Payments Program" and that the offeror has considered components of unknown origin to have been mined, produced, or manufactured outside the United States.

(ii) The offeror certifies that the following supplies are NAFTA country end products or Israeli end products as defined in the clause of this solicitation entitled "Buy American Act-North American Free Trade Agreement-Israeli Trade Act-Balance of Payments Program":

NAFTA Country or Israeli End Products:

| LINE ITEM NO. | COUNTRY OF ORIGIN |
|---------------|-------------------|
| | |
| | |
| | |

[List as necessary]

(iii) The offeror shall list those supplies that are foreign end products (other than those listed in paragraph (g)(1)(ii) or this provision) as defined in the clause of this solicitation entitled "Buy American Act-North American Free Trade Agreement-Israeli Trade Act-Balance of Payments Program." The offeror shall list as other foreign end products those end products manufactured in the United States that do not qualify as domestic end products.

Other Foreign End Products:

| LINE ITEM NO. | COUNTRY OF ORIGIN |
|---------------|-------------------|
| | |
| | |
| | |

[List as necessary]

(iv) The Government will evaluate offers in accordance with the policies and procedures of FAR Part 25.

(2) *Buy American Act-North American Free Trade Agreements-Israeli Trade Act-Balance of Payments Program Certificate, Alternate I (Feb 2000)*. If Alternate I to

the clause at FAR 52.225-3 is included in this solicitation, substitute the following paragraph (g)(1)(ii) for paragraph (g)(1)(ii) of the basic provision:

(g)(1)

(ii) The offeror certifies that the following supplies are Canadian end products as defined in the clause of this solicitation entitled "Buy American Act-North American Free Trade Agreement-Israeli Trade Act-Balance of Payments Program":

Canadian End Products

Line Item No.: _____
[List as necessary]

(3) *Buy American Act-North American Free Trade Agreements-Israeli Trade Act-Balance of Payments Program Certificate, Alternate II (Feb 2000)*. If Alternate II to the clause at FAR 52.225-3 is included in this solicitation, substitute the following paragraph (g)(1)(ii) for paragraph (g)(1)(ii) of the basic provision:

(g)(1)(ii) The offeror certifies that the following supplies are Canadian end products or Israeli end products as defined in the clause of this solicitation entitled "Buy American Act--North American Free Trade Agreement--Israeli Trade Act--Balance of Payments Program":

Canadian or Israeli End Products

| Line Item No.: | Country of Origin: |
|----------------|--------------------|
| | |
| | |
| | |

[List as necessary]

(4) *Trade Agreements Certificate*. (Applies only if the clause at FAR 52.225-5, Trade Agreements, is included in this solicitation.)

(i) The offeror certifies that each end product, except those listed in paragraph (g)(4)(ii) of this provision, is a U.S.-made, designated country, Caribbean Basin country, or NAFTA country end product, as defined in the clause of this solicitation entitled "Trade Agreements."

(ii) The offeror shall list as other end products those end products that are not U.S.-made, designated country, Caribbean Basin country, or NAFTA country end products.

Other End Products

| Line Item No.: | Country of Origin: |
|----------------|--------------------|
| | |
| | |
| | |

[List as necessary]

(iii) The Government will evaluate offers in accordance with the policies and procedures of FAR Part 25. For line items subject to the Trade Agreements Act, the Government will evaluate offers of U.S.-made, designated country, Caribbean Basin country, or NAFTA country end products without regard to the restrictions of the Buy American Act or the Balance of Payments Program. The Government will consider for award only offers of U.S.-made, designated country, Caribbean Basin country, or NAFTA country end products unless the Contracting Officer determines that there are no offers for such products or that the offers for such products are insufficient to fulfill the requirements of the solicitation.

(h) *Certification Regarding Debarment, Suspension or Ineligibility for Award (Executive Order 12549)*. The offeror certifies, to the best of its knowledge and belief, that --

(1) The offeror and/or any of its principals [] are, [] are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency, and

(2) [] Have, [] have not, within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a Federal, state or local government contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and [] are, [] are not presently indicted for, or otherwise criminally or civilly charged by a Government entity with, commission of any of these offenses.

(3) [] Are, [] are not presently indicted for, or otherwise criminally or civilly charged by a Government entity with, commission of any of these offenses; and

(i) The offeror, aside from the offenses enumerated in paragraphs (1), (2), and (3) of this paragraph (h), [] has [] has not within the past three years, relative to tax, labor and employment, environmental, antitrust, or consumer protection laws-

(A) Been convicted of a Federal or state felony (or has any Federal or state felony indictments currently pending against them); or

(B) Had a Federal court judgment in a civil case brought by the United States rendered against them; or

(C) Had an adverse decision by a Federal administrative law judge, board, or commission indicating a willful violation of law.

(ii) If the offeror has responded affirmatively, the offeror shall provide additional information requested by the Contracting Officer.

(i) Certification Regarding Debarment, Suspension or Ineligibility for Award (Executive Order 12549). The offeror certifies, to the best of its knowledge and belief, that--

(1) The offeror and/or any of its principals [] are, [] are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency; and

(2) [] Have, [] have not, within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a Federal, state or local government contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and [] are, [] are not presently indicted for, or otherwise criminally or civilly charged by a Government entity with, commission of any of these offenses.

(j) Certification Regarding Knowledge of Child Labor for Listed End Products (Executive Order 13126). [The Contracting Officer must list in paragraph (j)(1) any end products being acquired under this solicitation that are included in the List of Products Requiring Contractor Certification as to Forced or Indentured Child Labor, unless excluded at 22.1503(b).]

(1) Listed End Product

| Listed End Product | Listed Countries of Origin: |
|--------------------|-----------------------------|
| | |
| | |
| | |

(2) Certification. [If the Contracting Officer has identified end products and countries of origin in paragraph (i)(1) of this provision, then the offeror must certify to either (i)(2)(i) or (i)(2)(ii) by checking the appropriate block.]

☐ (i) The offeror will not supply any end product listed in paragraph (i)(1) of this provision that was mined, produced, or manufactured in the corresponding country as listed for that product.

☐ (ii) The offeror may supply an end product listed in paragraph (i)(1) of this provision that was mined, produced, or manufactured in the corresponding country as listed for that product. The offeror certifies that it has made a good faith effort to determine whether forced or indentured child labor was used to mine, produce, or manufacture any such end product furnished under this contract. On the basis of those efforts, the offeror certifies that it is not aware of any such use of child labor.

ADDENDA TO SOLICITATION PROVISIONS

252.212-7000 OFFEROR REPRESENTATIONS AND CERTIFICATIONS COMMERCIAL ITEMS (NOV 1995)

(a) Definitions.

As used in this clause

(1) Foreign person means any person other than a United States person as defined in Section 16(2) of the Export Administration Act of 1979 (50 U.S.C. App. Sec. 2415).

(2) United States person is defined in Section 16(2) of the Export Administration Act of 1979 and means any United States resident or national (other than an individual resident outside the United States and employed by other than a United States person), any domestic concern (including any permanent domestic establishment of any foreign concern), and any foreign subsidiary or affiliate (including any permanent foreign establishment) of any domestic concern which is controlled in fact by such domestic concern, as determined under regulations of the President.

(b) Certification.

By submitting this offer, the Offeror, if a foreign person, company or entity, certifies that it

(1) Does not comply with the Secondary Arab Boycott of Israel; and

(2) Is not taking or knowingly agreeing to take any action, with respect to the Secondary Boycott of Israel by Arab countries, which 50 U.S.C. App. Sec. 2407(a) prohibits a United States person from taking.

(c) Representation of Extent of Transportation by Sea. (This representation does not apply to solicitations for the direct purchase of ocean transportation services).

(1) The Offeror shall indicate by checking the appropriate blank in paragraph (c)(2) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term "supplies" is defined in the Transportation of Supplies by Sea clause of this solicitation.

(2) Representation.

The Offeror represents that it

_____ Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

_____ Does not anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

(3) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea clause. If the Offeror represents that it will not use ocean transportation, the resulting contract will also include the Defense Federal Acquisition Regulation Supplement clause at 252.2477024, Notification of Transportation of Supplies by Sea.

252.225-7006 BUY AMERICAN ACT - TRADE AGREEMENTS - BALANCE OF PAYMENTS PROGRAM CERTIFICATE (MAR 1998)

(a) Definitions.

"Caribbean Basin country end product," "designated country end product," "domestic end product," "NAFTA country end product," "nondesignated country end product," "qualifying country end product," and "U.S. made end product" have the meanings given in the Buy American Act--Trade Agreements--Balance of Payments Program clause of this solicitation.

(b) Evaluation.

Offers will be evaluated in accordance with the policies and procedures of Part 225 of the Defense Federal Acquisition Regulation Supplement. Offers of foreign end products that are not U.S. made, qualifying country, designated country, Caribbean Basin country, or

(c) **Certifications.**

(insert country of origin)

- (v) The Offeror certifies that the following supplies qualify as NAFTA country end products:

(insert line item number)

(insert country of origin)

- (vi) The following supplies are other nondesignated country end products.

(insert line item number)

(insert country of origin)

Attachments: In accordance with FAR 12.302, the following documents are hereby incorporated within this solicitation:

Attachment 1, Proposal Preparation Instructions (1 page)

Attachment 2, Evaluation Factors (1 page)

Attachment 3, Past Performance Questionnaire (1 page)

ATTACHMENT 1

PROPOSAL PREPARATION INSTRUCTIONS

Each prospective offeror shall adhere to the following requirements for submission of proposals. The following sections set forth the minimum aspects that must be covered:

1. Study Proposal - documentation demonstrating that the contractor 1) understands the nature of the project objectives as they relate to conserving biological diversity and ecological processes in a working landscape, 2) has developed a preliminary methodology for accomplishing the research objectives, and 3) has developed a preliminary concept for presenting the predicted effects of the problem in a spatially explicit fashion using GIS technology. The document shall include the following sections:
 - A. Introduction describing the nature of the problem and its relation to conserving biological diversity and ecological processes.
 - B. Methods for accomplishing the demographic and ecological research and incorporating the results into a spatially explicit, predictive model using GIS technology.
 - C. Schedule of estimated time that would be necessary to complete each of the project phases.
 - D. Description of all deliverables that would be provided to AAFB from the project.
2. Curriculum Vitae -- Provide a Curriculum Vitae for the principal investigator including a list of relevant prior publications.
3. Past Performance -- Provide information concerning relevant past performance as requested by Attachment 3. Submit information concerning a maximum of five projects within ten years preceding the issue date of this request for quote. Assurances of past performance without a clear demonstration to support the claim will adversely influence the evaluation of the Past Performance Questionnaire.
4. Price -- Detailed budget including line items for salaries and benefits, overhead, travel and lodging, and equipment shall be included in the technical proposal. Pricing information is to be inserted at the Schedule on page 2 of 25, continuation of Standard Form 1449.
5. Negotiations -- Negotiations may not be necessary and may not be used. You should, therefore, rely exclusively on your written material to convey your understanding of the project and your past performance

ATTACHMENT 2

EVALUATION FACTORS

PROPOSAL EVALUATION

This solicitation is a best value procurement. The Government specifically reserves the right to award the contract to that responsible offeror whose proposal is most advantageous to the Government, technical and price factors considered. "Best Value" means the Government may make award to other than the offeror proposing the lowest price or may make award to other than the offeror whose proposal receives the highest technical rating. The Government also reserves the right to make award on the basis of initial offers received. Negotiations may not be necessary and may not be used. Therefore, each initial offer should contain the offeror's best terms from a price and technical standpoint.

EVALUATION FACTORS

The proposals shall be evaluated using the three following criteria, with each criterion receiving equal weight.

1. Technical Compliance of the Item Offered to meet the Government Requirement - The technical evaluation will include examination of the offeror's approach in meeting the requirements of the statement of work. The technical proposal must include the minimum information listed in Attachment 1.
2. Past Performance - The offeror's past performance questionnaires will be evaluated to determine relevance of past work experience to the work required by this project and the satisfaction of past customers with the offeror's timeliness and technical capability.
3. Price - The offeror's proposed prices will be evaluated for fairness and reasonableness.

ATTACHMENT 3

PAST PERFORMANCE QUESTIONNAIRE

Instructions: Complete a sheet in this format for each job being described. Provide pertinent concise comments regarding your performance on the projects you identify. If more space is required, use the back of the page or a continuation sheet.

A. Offeror Name (Company/Division):

B. Project or Job Title:

C. Contract Specifics:

- (1) Contract Number
- (2) Contract Type
- (3) Period of Performance
- (4) Original Dollar Value of Contract
- (5) Current or Final Dollar Value of Contract

D. Brief Description of Effort as _____ Prime or _____ Subcontractor. (Focus on aspects of the work most relevant to this solicitation. If the original and current/final amounts are significantly different, briefly explain):

E. Primary Point(s) of Contact:

- (1) Name(s)
- (2) Office Address _____

(3) Telephone:

F. Describe any Technical Feature or other Characteristics of this Project You Consider Unique:

**Arnold Air Force Base
Pine Invasiveness Investigation and Modeling (E.2008)
Statement of Objectives**

I. Introduction

Arnold AFB (AAFB) is a 39,081-acre military located on the southeastern Highland Rim physiographic province in Tennessee, in an ecological system known as The Barrens. Barrens vegetation in Tennessee occurs as a mosaic of habitats that ranged from open grasslands and savannas to woodlands and forests (DeSelm 1990). Remnant barrens in the United States have been described by numerous authors (Baskin et al. 1994, DeSelm 1981, DeSelm 1989, DeSelm 1990, Homoya 1994, Heikens et al. 1994). Pyne (2000) reviewed the literature on barrens ecosystems and suggest the following characteristics make The Barrens of the southeast Highland Rim unique:

- While most examples of barrens vegetation (i.e., open canopy, or none at all, combined with a well-developed herbaceous stratum dominated by grasses and forbs) develop over shallow soils overlying bedrock, The Barrens occur on deeper soils developed from Pleistocene loess (DeSelm 1989). The loess overlies either residuum or alluvium, depending on the location within the region (C. Nelson, pers. comm.).
- A fragic layer is present, though discontinuous, in the loess soils of The Barrens and impedes drainage during wet seasons and upward capillary movement of ground water during periods of drought. The frequency and duration of alternating soil saturation and dessication varies according to the subtle topographic relief of the region and presence or absence of the fragipan. The variation in physical habitat underlies the mosaic of wetland and upland vegetation that characterizes the region.
- Extensive areas in the region are labeled as “The Barrens” on the USGS 1:24,000, 7.5’ topographic quadrangles that together cover the region. These landscape features are extensive enough that they retain this label on USGS 1:100,000, 30’ x 60’ quadrangles.

Gattinger (1901 in Pyne 2000) provided the first extensive descriptions of vegetation in The Barrens, and noted that no pines or firs were found in the region. This condition is apparent in large, unaltered forest tracts in the region today. Certain pine species are now planted for timber production in the region (Buckner et al. 1986 in Pyne 2000), and it appears that certain of these planted species [e.g., loblolly pine (*Pinus taeda*) and Virginia pine (*P. virginiana*)] are capable of invading native vegetation communities in The Barrens. It remains uncertain whether the introduced pine species are able to persist in the native vegetation and alter its composition and structure through continued reproduction and expansion over time.

Arnold AFB began planting loblolly pine, Virginia pine, eastern white pine (*P. strobus*), and short-leaf pine (*P. echinata*) into former agricultural fields on the base during the early 1950s. The 6,000 acres of pine stands have become an important pulpwood and sawtimber resource for the base, generating essentially all timber sale revenues from 1993 – present. Recognizing the economic potential of the planted and managed pine

forest, AAFB continues its pine silviculture program today. Loblolly pine is now planted for regeneration into the sites from which pine sawtimber and pulpwood are harvested, and it is managed on a 35-40 year harvest rotation.

Arnold AFB also protects and manages its 24,000 acres of native hardwood forest and barrens vegetation in an effort to maintain their ecological functions, values, and attendant biological diversity. While pine silviculture alleviates economic pressures (i.e., the need to generate sustainable revenues) on those resources, it could lead to changes in their structure, composition, and function if introduced pines become naturalized in the ecological system. This would be an undesirable, though potentially manageable, consequence of the forest management program. To develop effective management strategies, we must assess the potential for ecological changes to occur, evaluate the potential severity of those changes, and identify the resources at greatest risk for those changes to occur.

The objective of this project is to evaluate the demographics of introduced pine species in native vegetation communities surrounding established roadside plantings and pine plantations on AAFB. The study also will conduct mechanistic investigations into the ecological factors that enhance or limit the invasive potential of introduced pine species. The results of the demographic and mechanistic studies will be used to develop a spatially explicit, GIS model of predicted pine invasiveness on AAFB. The model and underlying demographic and mechanistic data will enable AAFB managers to develop the most cost-effective means for managing the threat that introduced pine species might pose to native vegetation communities.

The premise for this study is that observed expansion of the locally-exotic loblolly pine from roadside plantings and commercial plantations, dating from the earliest days of the base, have degraded oak-dominated plant communities and herb/grass-dominated communities. It is assumed that pine expansion will continue to occur in such areas, and may eventually lead to the replacement or exclusion of some natural communities. Pine species to be evaluated in this study include loblolly pine, Virginia pine, short-leaf pine, and eastern white pine.

This project supports the following selected goals and objectives stated in AEDC's Integrated Ecosystem Management Plan:

Ecosystem Management Goals

- I. Develop an Integrated Natural/Cultural Resources Management program that enhances AEDC's ability to achieve its mission.
 1. Integrate efforts concerning wetlands, native species, game and non-game species management, land use, cultural resources, and social and economic impacts of management activities with a regional perspective
- II. Maintain, enhance and/or restore the ecological integrity of AEDC lands through an approach to Integrated Natural Resources Management that utilizes adaptive management principles linking management with monitoring within a research framework.

1. Develop potential management actions that will maintain, enhance, and/or restore the ecological integrity of AEDC lands.
 2. Develop and/or evaluate management actions that will protect or enhance RTE plants and animals, and the habitats on which they depend.
 3. Use the best available information to recommend most appropriate areas for any given land use activity.
- III. Protect, restore, and maintain viable populations of native species found on AEDC, including the rare, threatened, and endangered flora and fauna species, in accordance with state and federal laws and regulations and adhering to the principles of ecosystem management.
1. Protect, restore, and maintain viable populations of native species found at AEDC.
- VII. Ensure that human uses of the land are consistent with protecting and maintaining ecological integrity.
3. Use community classification information to determine zones in which rare plant community types should be protected from high intensity land use activities.
 4. Develop management actions which ensure that land use activities adhere to ecosystem management guidelines.
 7. Identify appropriate silvicultural practices and systems to meet various ecosystem management objectives.
- VIII. Ensure that the outcomes of management actions are socially and economically acceptable.
2. Develop management strategies to resolve land use conflicts resulting from multiple uses.
 3. Identify forest management strategies for sustained forest production to meet targeted economic and social goals.

II. Objectives

The proposal shall describe the general methodology of a study that would, if implemented, meet the following objectives:

- A. Use existing AAFB data sources and scientific literature to develop a project database that includes for each pine stand included in the study:
1. The location and stand number
 2. Dates of plantings & dates of harvest
 3. Pine species included in plantings
 4. Size of plantation, number of pine stems, estimate of basal area of trees by species
 5. Age at which cones appear (literature values or local knowledge)
 6. Tree height
 7. Surrounding community types
 8. Soil series
 9. Relative cone crop and frequency
 10. Topographic position (slope direction, steepness, shape)
 11. Distance to nearest hydric soil

12. Elevation range
 13. Wind rose (local winds will be attempted)
- B. Demographic study – conduct literature review and field investigations in permanent plots to investigate the following:
1. the distance of pine regeneration from the seed source
 2. pine phenology and the distance of seed dispersal
 3. pine regeneration age, density, and growth rates in hydric vs. non-hydric soils
 4. pine regeneration age, density, and growth rates in closed- vs. open-canopy sites
 5. oak regeneration density and growth rates in sites that have been invaded by pine
 6. precipitation patterns following seed dispersal
 7. the effects of prevailing wind patterns on seed dispersal
 8. a comparison of loblolly, Virginia, eastern white, and short-leaf pine expansion out of the planted sites
 9. the factors that influence pine expansion in other ecosystems
- C. Mechanistic study – investigate environmental factors that favor or limit pine expansion into native plant communities, focusing on light, soil moisture, and soil nutrients. The mechanistic studies should include seed and seedling manipulation experiments.
- D. GIS predictive model – incorporate results from the demographic and mechanistic analyses into the development of a GIS predictive model that uses existing spatial coverages of physical and biotic factors to predict pine invasion patterns and rates for at least 100 years into the future. The model should be developed as a tool for AAFB land managers and be transferable for use by AAFB Conservation GIS staff.

III. Schedule and budget

The proposal shall include a schedule and line-item budget for accomplishing each of the objectives listed above.

IV. Deliverables

The proposal should include at a minimum the following deliverables:

A. Work Plan:

A work plan detailing specific methodology/procedures and outlining a specific project timeline will be prepared prior to initiating field investigations.

B. Quarterly Reports:

A quarterly report summarizing progress in all phases of the project will be prepared at appropriate intervals and will include any necessary project alterations and a summary of resources consumed.

C. Interim Report(s):

Annual interim reports summarizing the results of data collection from field activities will be prepared. These reports will include at a minimum an introductory section, methods, results, and discussion sections.

D. Final Report:

A final report summarizing the results of data collection from both the first and second season of field activities will be prepared. This report will include at a minimum an introductory section, methods, results, and discussion sections.

E. GIS Predictive Model and Spatial Data:

The GIS model will be developed as a tool for use by AAFB Conservation GIS staff and documentation will be provided for turnkey integration with the Conservation GIS.

A GIS coverage for each plot/sample area will be provided. These coverages will provide the precise locations and dimensions of each plot/sample area and designate a unique identifier for the plot. All plot data will be provided in database attribute tables that can be related to the GIS coverage through the unique identifier.

All database format and design decisions will be made in coordination with AAFB Conservation GIS staff.

Literature Cited

- Baskin, J. M., C. C. Baskin, and E. W. Chester. 1994. The Big Barrens region of Kentucky and Tennessee: further observations and considerations. *Castanea* 59:226-254.
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